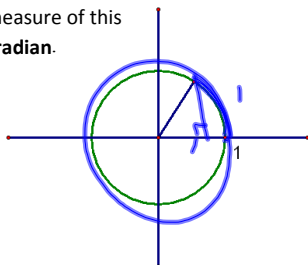


## Radians

A radian is defined using the unit circle, which is a circle with a radius of 1 unit centered at the origin. When a central angle intercepts an arc that has the same length as a radius of the circle, the measure of this angle is defined to be one **radian**.

$$C = 2\pi$$



The circumference of a circle is  $2\pi r$ , where  $r$  is the length of a radius. There are  $2\pi$  radians in one complete revolution about a point and one complete revolution equals  $360^\circ$ .

$$2\pi \text{ radians} = 360^\circ \quad \pi \text{ radians} = 180^\circ \quad 1 \text{ radian} \approx 57.3^\circ$$

Convert each degree measure to radian measure.

a.  $120^\circ$       b.  $-245^\circ$

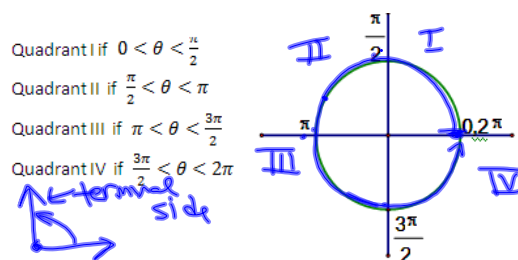
$\frac{\pi}{180}$        $\frac{2\pi}{3}$        $\frac{\pi}{180}$        $\frac{-49\pi}{36}$

Convert each radian measure to degree measure.

a.  $\frac{\pi}{3}$  radians      b.  $\frac{3\pi}{4}$  radians

*Handwritten notes:*

- For (a):  $\frac{\pi}{3}$  (with  $\pi$  crossed out and  $180$  written above it), and  $60^\circ$  circled below.
- For (b):  $-135^\circ$



In which quadrant or on which axis does the terminal side of the angle lie?

a.  $\frac{4\pi}{3}$  QIII

b.  $-\frac{5\pi}{4}$  clockwise QII

c.  $\frac{9\pi}{2}$  on positive y-axis

$$1 \text{ minute } (1') = \left(\frac{1}{60}\right)^\circ \quad 1 \text{ second } (1'') = \left(\frac{1}{60}\right)' \text{ or } \left(\frac{1}{3600}\right)^\circ$$

Convert each angle measure as indicated.

a.  $12.464^\circ$  to degrees, minutes and seconds, to the nearest second.

$.464(60) = \boxed{27} 84$      $\boxed{12^{\circ} 27' 50''}$   
 $.84(60) = 50.4''$

b.  $23^{\circ}42'45''$  to decimal degrees, to the nearest tenth.

$$23 + \frac{42}{60} + \frac{45}{360} = \boxed{23.7^\circ}$$